TRENDS IN INPATIENT USE BY THE ELDERLY AND OTHER ADULTS FOR SELECTED PROCEDURES: 1982-1987

Final Report

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1.0 INTRODUCTION

1.1 Statement of the Problem

Medicare expenditures on physicians' services have been increasing steadily through the 1980's. Spending per eligible rose 29.5 percent from 1983 to 1986, even though fees were frozen for most of this period (Mitchell et al., 1989). Although those figures were based on data from only four states, comparable rates of growth were observed for the Medicare program as a whole (Board of Trustees, 1988). Increased spending on surgical services accounted for the largest portion of the increase (41 percent), with spending on radiology and other diagnostic tests responsible for an additional one-quarter of the expenditure growth.

Given that fees were frozen, an increase in the volume of services was by necessity a factor in the expenditure growth. The Mitchell et al., study found, for example, increases in the utilization rates of such procedures as coronary artery bypass graft (CABG) surgery, cardiac catheterization, hip and knee replacement, colonoscopy, and cataract surgery. At the same time, Medicare rates for other procedures, like thromboendarterectomy and cholecystectomy, were declining in the study states. Many factors may be responsible for these changes, of which the fee freeze is only one. Other potential factors include:

- growth in ambulatory surgical centers which made it both more convenient and perhaps, less costly for Medicare patients to undergo certain procedures;
- implementation of the Medicare Prospective Payment System that encouraged hospitals to shift some care to ambulatory facilities in which services were still paid on the basis of costs.
- pressure from Peer Review Organizations (PROs), which reinforced the tendency to shift care to ambulatory settings;
- changes in perceived effectiveness (or non-effectiveness) of particular procedures, e.g., the recent literature on the inappropriateness of carotid thromboendarterectomy;
- diffusion of technology, like cardiac catheterization laboratories and CT scanners; and
- increasing supply of physicians, which means that more physicians are available to provide services to patients.

Some of these factors are Medicare-specific, like the fee freeze and PPS, and we would expect them to affect utilization rates for Medicare beneficiaries alone. Others, such as technology diffusion and the larger numbers of physicians in practice, are apt to influence the provision of services to all patients, regardless of payor.

This report seeks to compare trends in inpatient use of surgical and other procedures by Medicare and non-Medicare patients. Ideally, we would compare utilization rates across all locations, but national data are not available to do this. Instead, we take advantage of the National Hospital Discharge Surveys, conducted annually by the National Center for Health Statistics, which provide information on all patients, regardless of payor. Discharges for patients aged 65 years and older are used to proxy Medicare discharges, with patients aged 45 to 64 serving as a comparison group.

1.2 Executive Summary

Medicare expenditures for physician services have increased dramatically in recent years, and one element of that growth has been the larger volume of physician services provided to hospitalized patients. This paper uses data from the National Hospital Discharge Survey to determine the extent to which these increases in the volume of physician services provided to Medicare inpatients are a phenomenon of non-Medicare patients, as well.

The National Hospital Discharge Survey (NHDS) is conducted annually by the National Center for Health Statistics using a two-stage process to sample hospitals and patients. In 1987, the hospital sample consisted of 400 institutions from which approximately 180,000 discharges were selected.

Data from the NHDS have two important advantages: first, they are drawn from nationally representative samples and, secondly, they provide a uniform data set containing information on all age groups, regardless of payor. On the other hand, data are available only for inpatients; shifts from inpatient to outpatient services cannot be distinguished from simple declines in utilization.

In this study, comparisons are made of utilization rates for certain surgical procedures and diagnostic tests for two age groups: those 65 years and over, to represent Medicare patients (more than 90 percent of elderly patients were insured by Medicare), and those aged 45 to 64 years old. The latter group was chosen as the closest group to the elderly and therefore likely to experience many of the same conditions, thus permitting direct comparisons.

During the study period, hospital admissions and patient days dropped for all age groups. Against this background of dramatically lowered use of the hospital, the overall rate of inpatient procedures performed by physicians increased between 1982 and 1987 by 5.7 percent for those aged 45 to 64 and by 21.7 percent for those aged 65 or over. These increases were not uniform, however, because while procedures performed in non-operating room sites increased, operating room procedures declined. Thus, the rate of diagnostic procedures performed in hospital ORs declined by 50 percent for the 45 to 64 year old age group and by 36 percent for the elderly. Therapeutic procedures performed in the OR also dropped for both groups, but by relatively smaller amounts: 11 percent for the younger patients and 8 percent for the elderly. By contrast, non-OR procedures increased substantially for both groups: diagnostic procedures, by 43 percent and 72 percent, respectively, and therapeutic procedures, by 18 percent and 41 percent.

Looking at specific procedures, the general trend was reflected in the decline in rates of inpatient cataract extractions and lens insertions: by more than 80 percent for both age groups, undoubtedly reflecting a shift to outpatient settings. By contrast, other OR procedures were performed more frequently; coronary artery bypass graft (CABG) surgery, for example, increased by 58 percent for the 45 to 64 year old group and by 168 percent for the elderly.

Other cardiac procedures, including cardiac catheterization (increases of 65 percent and 159 percent, respectively) and angiocardiography (141 percent and 270 percent, respectively), which do not require an OR, also grew dramatically, thus, reflecting the general pattern. Similarly, the rates

of a number of non-OR diagnostic imaging procedures (e.g., CT scans and diagnostic ultrasound) more than doubled for both age groups between 1982 and 1987.

The magnitude of these changes is large enough that they will have a major influence on both the use of hospital capacity and health care expenditures. It is thus important to understand why they have occurred.

Several changes in Medicare policy in recent years have made it advantageous to shift some procedures out of the inpatient setting to other sites. Among these are the new benefit introduced in OBRA 1980 that covered surgery in ambulatory surgery centers (ASCs); the waiver of Part B deductible and copayments for patients using ASCs (recently revoked); the introduction of the prospective payment system that made it sensible for hospitals to shift some care from inpatient to outpatient settings; and denial by Peer Review Organizations (PROs) of Medicare payment for inappropriate or unnecessary admissions.

The fact is, however, that while these Medicare policy changes may explain some of the changes in utilization for elderly patients, they do not explain either the often larger changes observed for the 45 to 64 year old group or the increases in some inpatient procedures for Medicare patients. Private insurers and employers have been as concerned as Medicare officials about the high cost of medical care; and the growth of HMOs, PPOs, and other cost-conscious plans in the private sector also have attempted to reduce inpatient services. But little is known about the effects of specific developments among these plans on utilization and expenditures.

Several major questions remain:

(1) to what extent does the decline in inpatient use of some procedures indicate a shift to lower-cost outpatient settings?

(2) to what extent is it instead a reduction in the use of the procedure altogether?

(3) to what extent did the increase in outpatient surgery, especially if it reflected a shift from inpatient settings, lead to reduced expenditures overall?

(4) what accounts for the increases in other procedures: improvements in medical technology; diffusion of new procedures to a wider group of practitioners; or increases in the incidence of particular diseases among the groups studied, including the larger numbers of very old people?

These questions remain unanswered, but if we are to understand and hope to control this growth in expenditures, we need to find the answers. More research is needed using multi-year, all-payor, patient-specific data including utilization and expenditures for all major services and all sites of care.

1.3 Overview of Report

Section 2.0 discusses our data source for the study and our method of analysis. We summarize the data sampling methods used to obtain the original data set, and describe the advantages and disadvantages of working with these data. We then explain our choice of the patient age groups used for comparison in the study, our development of four broad categories of procedures to summarize changes in inpatient physician procedure rates, and our selection of individual procedures for closer analysis.

Section 3.0 presents the results of our analysis, including:

- a summary of trends in hospital utilization generally during the study period, to place changes in inpatient physician procedure rates in perspective;
- changes in our four broad categories of physician procedures;
- changes in the rates of individual procedures chosen for closer analysis.

Section 4.0 contains a discussion of the implications of the findings.

2.0 DATA SOURCE AND METHOD OF ANALYSIS

2.1 Description of Data Source

The present study examines the rate of growth for physician procedures performed on inpatient services between 1982 and 1987. The data source is the National Hospital Discharge Survey (NHDS), an annual survey of hospital discharge records conducted by the National Center for Health Statistics. The survey uses a two-stage sampling method. First, a sample of hospitals (stratified by bedsize) is drawn from the universe of all U.S. short-stay hospitals, excluding military and VA hospitals. A new hospital sample is drawn periodically to account for changes (such as new hospitals and hospital mergers) in the universe. Hospitals with fewer than six beds and hospitals with average lengths of stay greater than 30 days are also excluded from the sample. In 1987, for example, the hospital sample consisted initially of 558 hospitals. Of these, 158 hospitals refused to participate in the survey or were excluded from analysis because they were no longer in business or were not short-stay hospitals (Graves, 1989). Figures for other years are comparable.

The second stage of the sampling method consists of random selection of discharge abstracts within each of the facilities in the hospital sample. From the 400 hospitals participating in the 1987 survey, discharge abstracts were obtained for approximately 181,000 medical records (Graves, 1989).

Larger hospitals were more likely to be included in the sample, but a smaller proportion of discharge records from these hospitals was selected for analysis. The overall probability of selecting a discharge for inclusion in the survey was approximately the same for each size class of hospitals (Graves, 1989).

Discharge data for the survey were obtained either manually (by abstracting medical records), or by analyzing data tapes from commercial abstracting services. In either case, a maximum of four surgical operations or other physician procedures were retained for each discharge record. These procedures usually comprise the more invasive and more costly physician

procedures; less costly or noninvasive procedures were less likely to be represented in hospital discharge abstracts. Thus, many minor physician procedures (such as routine X-rays) will be markedly underestimated by the NHDS survey.

The only types of procedures excluded from our analysis were oral surgery, obstetrical procedures, laboratory services, and routine radiologic procedures. The first two groups of procedures (oral surgery and obstetrics) were thought to be of little relevance in a study of physician procedures under Medicare. Gynecologic procedures, however, were retained in the data. The latter two groups (laboratory and routine radiologic procedures) were deleted since data obtained from discharge abstracts are extremely unlikely to permit accurate counts of these relatively minor procedures.

Note, however, that in addition to surgical procedures, data were retained for CT scans, MRI scans, diagnostic ultrasound, cardiac angiography, ventriculography and bone scans. These latter procedures were retained in the data set because they are examples of relatively new, relatively expensive imaging technologies which are either still diffusing geographically or are being employed for an expanding set of clinical indications.

CT scans employ X-rays together with sophisticated computer technology to obtain cross-sectional images of the body that cannot be obtained through routine X-ray technology. The diagnostic information gained from these studies is often far superior to that obtained from routine X-rays, especially in large non-bony areas of the body such as the brain, the lungs, and the abdominal and pelvic cavities. Magnetic nuclear resonance (MRI) imaging uses similar computer technology to produce multiple, highly-resolved images. However, MRI scans have the advantage of using no X-rays. Instead, the patient is placed in a strong magnetic field, and certain atoms within the body are caused to "resonate." The energy given off when that atomic resonance ceases is used to produce MRI images.

Diagnostic ultrasound images are obtained by directing sound waves into the body and recording their reflections. The electronically reprocessed reflections of these sound waves form an image that gives diagnostic information about size, shape, and relative composition of body tissues.

Although the image obtained from ultrasound is less detailed than that from a CT scan, ultrasound imaging uses no X-rays and can therefore be used in many situations where CT scans could be harmful (for example, in a pregnant woman, or when repeated or prolonged imaging is required).

Cardiac angiography requires injection of dye into coronary arteries through a catheter advanced through the heart. X-ray images of the arteries are then obtained. Ventriculography and bone scans image the chambers of the heart and the skeletal system, respectively, by making use of quickly decaying, weakly radioactive substances that are preferentially absorbed by certain body tissues.

2.2 Case Weights and Sampling Error

In addition to procedure codes for up to four surgical operations or other procedures, the NHDS survey data includes information on patient age, diagnoses, length of stay, geographic region, hospital size and type, and source of payment. The NHDS annual survey also includes population estimates by age group so that utilization rates can be constructed from weighted procedure totals.

Each discharge record included in the survey is assigned a weight, based on sampling methods, that estimates the total number of discharges in the population reflected by the sampled discharge. The weights used to obtain these estimates are derived using complex formulas based in part on:

- the probability of selecting the sample hospitals, and the probability of selecting individual discharges within each sampled hospital; and
- a nonresponse adjustment for sampled hospitals that failed to supply data for part or all of the survey year, and for missing records within each sampled hospital. (National Center for Health Statistics, 1967.)

Given the complex sampling and weighting procedures used, calculation of the sampling error for each procedure is extremely difficult and time-consuming. However, the National Center for Health Statistics recommends as a general rule that data for procedures with estimated (weighted) annual frequencies under 5,000 (or an actual n less than 30) should not be used, and

that data for procedures with estimated annual frequencies under 10,000 (n less than 60) should be interpreted with caution. We have followed the first part of this rule in our study by omitting data for procedures based on a sample of 30 or less. We have used an even more conservative standard, however, for the second part by noting in our tables those cells in which utilization rates of procedures are based on samples of less than 100 (instead of the NCHS-recommended 60), so that the reader may use caution in interpreting year-to-year changes in these data. Finally, using standard errors estimated from NHDS publications, we have calculated upper and lower limit utilization rates with a 95 percent confidence interval. If the 1987 utilization rate fell within the 1982 limits, we indicated in the table that it was not statistically significant from the 1982 rate.

2.3 Advantages and Disadvantages of National Hospital Discharge Survey Data

Data from the NHDS have two important advantages. First, they are drawn from nationally representative samples and, secondly, they provide a uniform data set containing information on all age groups, regardless of payer.

Use of NHDS data also imposes some limitations, however. Data are available only for inpatients; thus, total utilization rates for physician procedures (that is, including all service locations) cannot be derived. Similarly, shifts in location of procedures from inpatient to outpatient services cannot be distinguished from simple declines in inpatient utilization.

2.4 Method of Analysis

Two age groups were selected for analysis in this study. Patients aged 65 or over were chosen to represent the Medicare population. (In fact, more than 90 percent of patients aged 65 or older in this survey were covered by Medicare.) Patients aged 45 to 64 were chosen as a comparison group for several reasons. First, the prevalence of certain chronic conditions such as heart disease should be similar enough in the younger and older age groups to allow comparisons of changes in rates of utilization of relevant physician

procedures, such as coronary artery bypass surgery (CABG), cholecystectomy, and joint replacements. Second, selection of the patients aged 45-64 as a comparison group eliminates the pediatric and obstetric populations, as well as procedures restricted to those populations, from consideration in our analysis.

Although we intended to study a small number of selected procedures separately, we also wanted to be able to distinguish major trends in the data. We were concerned that a single measure of change in the overall rate of physician procedures might obscure important differences between procedure types. Specifically, we were concerned that trends in "major" procedures (those requiring the use of an operating room) might differ from trends for "minor" procedures. We also thought it necessary to distinguish diagnostic from therapeutic procedures, since previous work (Menke, Mitchell, and Boutwell, 1989) examining the effects of hospital prospective payment had found large increases in both inpatient and outpatient spending for diagnostic services such as cardiac catheterization, radiology, and special tests.

We therefore developed a classification system which placed all inpatient physician procedures into one of four categories. NHDS data for the six years in our study period (1982 to 1987) were then summarized within age group and within each of these two categorization schemes: individual procedures of special interest and the all-inclusive four categories of procedures. The case weights for individual discharges were summed within each analytic cell, and the sums were divided by appropriate population figures to obtain utilization rates.

Our four categories are listed below, along with examples of procedures contained in each.*

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*The four categories were developed using The DRG-ICD-9-CM Code Book (Washington, St. Anthony Hospital Publications, 1986). In this manual, the Procedure Classification is a modification of the WHO's Fascicle V, "Surgical Procedures," taken from HCFA material. OR procedures are generally those that precipitate assignment to a surgical DRG. Diagnostic procedures are usually grouped together under an appropriate heading that includes the word "diagnostic." Therapeutic procedures are usually indicated by words such as "repair," "replacement," "removal," and so forth. In some cases, the authors' judgment was used to determine whether a procedure was primarily diagnostic or therapeutic.

Diagnostic OR Procedures

Most procedures in this group are "open" biopsies of internal organs such as brain, lung, liver, or kidney. Open biopsies require direct access to the organ through a major surgical incision. Such biopsies require general anesthesia and are performed in operating rooms. (Open biopsies can be contrasted with "percutaneous" or "needle" biopsies, which are performed through the skin, usually under local anesthesia, in non-OR locations.)

Diagnostic Non-OR Procedures

This group includes endoscopies, radiologic and other imaging procedures such as ultrasound, cardiac catheterization and biopsies performed through the skin using needles.

Therapeutic OR Procedures

Most forms of "major surgery" fall into this group. Common examples are hysterectomy, cholecystectomy, joint replacements, and inguinal hernia repair.

Therapeutic Non-OR Procedures

This category includes minor procedures which can be performed on a hospital ward, in an ICU or an emergency room, in a specially-equipped "procedure room," or even in a physician's office. They do not require the use of a standard operating room. Examples of such procedures include suturing of minor lacerations, excision of minor skin lesions, and routine setting of bone fractures.

In addition, we selected individual procedures for special study (see Table 2-1). These procedures were chosen because: (1) they were high-volume Medicare procedures; or (2) previous studies had documented rapid growth in Medicare use.

We initially analyzed data for these selected procedures by simply counting the number of procedures within appropriate procedure code ranges. However, we were concerned that this method might overestimate the annual rates for some types of procedures. In particular, we were concerned about the possibility that, for a single discharge, multiple procedure codes might

TABLE 2-1

PROCEDURES SELECTED FOR INDIVIDUAL ANALYSIS

Procedure	ICD-9 Codes
Endoscopies	
Laryngoscopy	31.42 to 31.44
Bronchoscopy	33.22, 33.23, 33.24, 33.27
Esophagoscopy	42.23, 42.24
Gastroscopy	44.13, 44.14
Endoscopy of small intestine	45.13, 45.14
Colonoscopy	45.24, 45.25
Cystoscopy	57.32, 57.33
Cardiac Procedures	
Coronary artery bypass graft (CABG)	36.10 to 36.19
Percutaneous transluminal coronary angioplasty (PTCA)	36.0, 36.00 to 36.05
Cardiac catheterization	37.21 to 37.23
Angiocardiography	88.50 to 88.58
Temporary pacemaker	37.70 to 37.78
Permanent pacemaker	37.80 to 37.89
Electrocardiographic monitoring	89.54
CT Scans	
Head	87.03
Thorax	87.41
Abdomen	88.01
Other	87.71, 88.38
Magnetic Resonance Imaging (MRI)	88.91 to 88.95, 88.99
Diagnostic Ultrasound	88.71 to 88.79
General Surgery	
Total cholecystectomy	51.22
Common bile duct exploration	51.41, 51.51
Partial excision, large intestine	45.71 to 45.76, 45.79
Colostomy	46.10 to 46.14
Inguinal hernia repair	53.00 to 53.17
Orthopedic Surgery	
Open reduction and internal fixation of femur (ORIF)	79.35
Total hip replacement	81.51, 81.59
Total knee replacement	81.41
Arthroscopy	80.20 to 80.29
Ophthalmologic Procedures	
Cataract extraction	13.10 to 13.69
Lens insertion	13.70 to 13.72
Miscellaneous Procedures	
Carotid endarterectomy	38.12
Transuretheral prostatectomy (TURP)	60.2
Hemodialysis	39.95
Gynecologic Procedures	
Total abdominal hysterectomy	68.4
D & C of uterus	69.09

have been used to describe a single category of procedures. We therefore recalculated the annual rates for three types of procedures (coronary artery bypass surgery, cardiac catheterization, and angiocardiography) based on the number of discharges in which these procedures had been coded. We found that annual rates for cardiac catheterization were similar, whether based on total procedures or on total discharges. However, for angiocardiography and coronary artery bypass surgery, rates based on procedure counts were 30 to 50 percent higher than rates based on counts of discharges; such discrepancies were more marked in later years.

These discrepancies in calculated annual rates appear to arise from the use of more than one ICD-9 code to describe bypass surgery or angiocardiography. For example, a discharge abstract might appropriately indicate that two types of bypass surgery were performed (a standard bypass procedure in addition to an internal mammary artery-coronary artery bypass), or that angiocardiography was performed for two different structures (venae cavae and right heart). For these categories, annual rates based on counts of procedures in NHDS data are therefore likely to be inflated; rates based on counts of discharges are likely to be more accurate.

3.0 RESULTS

3.1 Trends in Overall Hospital Use

The results of our analysis of inpatient physician procedures need to be viewed in the context of concurrent trends in hospital use. Between 1982 and 1987, admission rates for both age groups declined substantially (see Table 3-1). The absolute decline in admissions per 1,000 population was greater for the older age group: a drop of 48 per 1,000 for those 65 or older versus 39 per 1,000 for those aged 45 to 64. Since the elderly are more likely to be hospitalized, however, in relative terms, the decrease was greater for the younger age group. Thus, the admission rate for those aged 45 to 64, declined by 19.9 percent over the six-year period, versus 12 percent for the older age group.

Total inpatient days per 1,000 also decreased for both age groups during this six year period. Again, the absolute decline in inpatient days per 1,000 was greater for the older age group (998 days versus 476 days), but the relative decline was larger for the younger age group (30.8% versus 24.8%). Thus, at the same time that Medicare's prospective hospital payment system was contributing to decreased hospital use for the elderly, other factors were causing an even greater proportional decline in use of hospitals by the non-elderly. It is worth noting that some of this difference in the rate of decline may be accounted for by demographic shifts. The number of the very old (those over age 75) have increased faster than those aged 65 to 74 and, thus, comprise a larger proportion of the elderly now than they did at the start of the study period. Since the very old also have higher hospital use rates, the growth in their numbers may have attenuated the reduction for the elderly as a whole.

Some of the decrease in hospitalization use for both age groups may be accounted for by more stringent standards (enforced through preadmission and concurrent review programs) for inpatient evaluation and treatment of medical conditions such as diabetes and hypertension, and for elective surgical procedures. Another possible factor in the decreasing admission rates is the

TABLE 3-1

DISCHARGE RATES AND INPATIENT DAYS PER 1,000 BY AGE GROUP, 1982 TO 1987

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Discharge Rates								
Age 45-64	196	192	183	170	162	157	-39	-19.9%
Age 65+	399	413	400	368	367	351	-48	-12.0
Inpatient Days								
Age 45-64	1,545	1,461	1,317	1,187	1,101	1,069	-476	-30.8%
Age 65+	4,028	4,004	3,575	3,204	3,121	3,030	-998	-24.8

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

extent to which ambulatory or day surgery has been substituted for inpatient surgery. Of course, avoidance of either type of admission (medical or surgical) results in a decrease in inpatients for whom physicians can perform procedures. The overall rate of inpatient procedures per physician will also decrease, unless physicians markedly increase the number of procedures provided to the diminishing pool of inpatients. Physician procedure rates per admission may increase if the average patient requiring admission in later years was sicker than the average patient previously. In addition, contemporary standards of care may require the performance of more procedures because of changes in technology or patient expectations. Finally, physicians may have been influenced to provide more procedures by a number of forces affecting reimbursement and the organization of practice.

3.2 Changes in Rates of Four Types of Procedures

In fact, the overall rate of inpatient physician procedures did increase between 1982 and 1987, despite decreasing inpatient hospital use. For patients aged 45 to 64, the increase was 5.7 percent; for those 65 and older, the increase was 21.7 percent (Table 3-2). In this and subsequent tables, utilization rates per 1,000 population are presented for both age groups and for each of the six study years for the indicated procedures. The next to last column presents the absolute change in the number per 1,000 from 1982 to 1987, while the final column displays the percent change in these rates. Both change measures are shown, as small absolute changes for some procedures produce excessively large changes in percentage terms.

These increases can be further analyzed by type of procedure. As discussed above, we regrouped all ICD-9 codes for physician procedures into four categories. Our results indicate that the inpatient rates of both diagnostic and therapeutic operating room (OR) procedures decreased substantially between 1982 and 1987. There was a 50 percent decrease in the rate of inpatient diagnostic OR procedures for the 45 to 64 age group, and a 36 percent decrease for the 65+ age group. These declines in diagnostic OR services can be accounted for by changes in just a few types of procedures,

TABLE 3-2

INPATIENT UTILIZATION RATES PER 1,000 POPULATION BY CATEGORY OF PHYSICIAN PROCEDURE

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Total Inpatient								
Age 45-64	165.6	168.8	170.3	167.7	170.4	175.0	9.4	5.7%
Age 65+	287.7	314.8	328.7	325.3	343.6	350.1	62.4	21.7
Diagnostic OR								
Age 45-64	8.2	8.2	7.5	6.2	5.2	4.1	-4.1	-50.0
Age 65+	11.9	12.5	13.5	11.6	10.2	7.6	-4.3	-36.1
Diagnostic Non-OR								
Age 45-64	49.5	53.0	55.6	61.0	65.5	70.7	21.2	42.8
Age 65+	96.8	109.3	126.9	141.4	157.5	166.8	70.0	72.3
Therapeutic OR								
Age 45-64	95.1	94.5	93.5	86.6	84.7	85.1	-10.0	-10.5
Age 65+	156.4	168.9	162.2	144.7	143.9	143.8	-12.6	-8.1
Therapeutic Non-OR								
Age 45-64	12.9	13.1	13.7	13.8	15.0	15.2	2.3	17.8
Age 65+	22.5	24.0	26.2	27.6	32.0	31.8	9.3	41.3

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

particularly laparoscopy, D&C, and arthroscopy. Because the utilization rates were low for diagnostic procedures performed in the OR, these relatively large percent changes reflected only small reductions (4.1 per 1,000 and 4.3 per 1,000, respectively) in the actual utilization rates and thus had little overall impact.

By contrast, much smaller proportional decreases in rates of therapeutic procedures performed in the OR had larger effects on total utilization. Thus, for the 45 to 64 age group, a reduction of 10.5 percent (only 1/5 the percent reduction in diagnostic OR procedures) resulted in a decrease of ten procedures per thousand (2-1/2 times the change in actual diagnostic OR rates). Trends for the elderly were of similar magnitude and in the same direction.

Three procedures contributed significantly to these declines: cataract extraction, artificial lens insertion, and inguinal hernia repair. The first two procedures accounted for a greater proportion of the decline in inpatient therapeutic OR procedures among the elderly, while inguinal hernia repairs accounted for a higher proportion of the decline among patients aged 45 to 64. It is likely that for all the OR procedures mentioned, the decrease in inpatient rates represents a shift in location to ambulatory settings, rather than a substantial decline in the overall utilization rate.

In contrast to OR procedures, inpatient diagnostic and therapeutic non-OR procedures increased for both age groups between 1982 and 1987, although the increases were more dramatic for the elderly. The increase in utilization rates for diagnostic non-OR procedures were 43 percent for those aged 45 to 64, and 72 percent for those 65 years and older. Because the volumes were large, the absolute increases in rates per 1,000 for these procedures were also large (21 and 70 per 1,000, respectively). Various forms of diagnostic imaging (including CT scans, ultrasound, cardiac angiography, and bone scans) accounted for the largest part of these increases for both age groups, although cardiac catheterization and cardiac monitoring (e.g., in an ICU or CCU) also increased markedly over the six-year period.

For therapeutic non-OR procedures, the increases were 18 percent for those aged 45 to 64 and 41 percent for those aged 65 and older. The respective changes in absolute rates were 2.3 and 9.3 per 1,000 population. Two groups of relatively simple procedures were responsible for nearly one-half of the increase in therapeutic non-OR procedures: insertion or replacement of indwelling urinary catheters, and puncturing of vessels (including routine venipuncture, and insertion of arterial and intravenous catheters). As discussed earlier, it is likely that much of the increase in these procedures represents an increase in reporting on the hospital discharge abstracts, rather than a true increase in the rates of these procedures.

In summary, our analysis of four broad categories of inpatient physician procedures has revealed that rates of OR procedures have decreased for both age groups, although the decreases were relatively larger for the younger age group. The observed decreases are consistent with a shift of many surgical procedures (both diagnostic and therapeutic) to ambulatory surgical settings, and are also consistent with previously discussed declines in hospital admission rates (again, relatively more marked for the younger age group). At the same time, there has been an increase in non-OR procedures provided to the smaller number of patients being admitted to hospitals. The impact of the increases in non-OR procedures are more marked for the elderly, in part because of their higher rate of hospitalization (more than double that for the 45 to 64 age group in 1987).

The dramatic increase in diagnostic non-OR procedures between 1982 and 1987 may be explained by a combination of two factors. For some procedures, the true rate of inpatient utilization (and of outpatient utilization, as well) may actually have increased during the study period. For others, the reporting of the procedure on hospital discharge abstracts (the source of NHDS data) may have increased to reflect more closely the true utilization rate. Changes in reimbursement, such as PPS, undoubtedly have encouraged hospitals to report minor procedures more completely in their hospital discharge data in the hope of increasing reimbursement.

3.3 Changes in Rates of Specific Procedures of Interest

Since aggregating utilization data by broad categories of procedures, as we did in the previous section, may mask important within-category variation, we turn now to an examination of individual procedures. The tables accompanying this section report several families of procedures, and each one is presented in the same format as Table 3-2. Following the advice of NCHS, we omitted data on the utilization for procedures when the number of cases sampled was less than 30. Rates based on fewer than 100 cases (but more than 30) have been noted with an asterisk, and should be interpreted with caution.

3.3.1 Endoscopic Procedures

Table 3-3 presents changes in inpatient utilization rates for seven types of endoscopies. With the exception of endoscopy of the small intestine (and gastroscopy in the case of the elderly), all of these procedures either remained fairly stable or declined in frequency in the hospital. Rates for the first three procedures (laryngoscopy, bronchoscopy, and esophagoscopy) were basically unchanged over the 1982-1987 period. Although the percentages show some precipitous reductions, these should not be taken at face value, given the very small actual number of procedures.

Endoscopy of the small intestine (also known as upper GI endoscopy) was performed increasingly frequently in the hospital among both age groups; its rate more than doubled among the elderly in six years. By contrast, colonoscopy rates declined during the same time period, particularly among those aged 45 to 64. The presumably reflects a shift of colonoscopy to outpatient settings, as Mitchell _et al_., (1989) found large increases in total colonoscopy use for Medicare patients.

Cystoscopy rates have fallen for both age-groups; presumably this procedure is being performed with increasing frequency in outpatient settings. By contrast, gastroscopy use has risen for the elderly, with no change for those aged 45 to 64.

TABLE 3-3

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED ENDOSCOPIC PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change In Rate 1982-1987	Percent Change In Rate 1982-1987
Laryngoscopy								
Age 45-64	1.1	1.0	1.0	0.7	0.6	0.5	-0.6	-54.5%
Age 65+	1.3	1.2	1.4	0.9	0.9	0.6*	---	---
Bronchoscopy								
Age 45-64	2.8	2.7	2.6	2.4	2.4	2.3	-0.5	-17.9
Age 65+	5.2	5.5	5.6	5.4	5.2	5.7	0.5	9.6
Esophagoscopy								
Age 45-64	0.8	0.8	0.8	0.7	0.6	0.6	-0.2	-25.0
Age 65+	1.3	1.4	1.7	1.4	1.5	1.3	0.0**	0.0
Gastroscopy								
Age 45-64	1.3	1.5	1.2	1.1	1.1	1.2	-0.1**	-7.7
Age 65+	2.6	2.5	2.7	3.2	3.8	4.0	1.4	53.8
Endoscopy of Small Intestine								
Age 45-64	3.3	3.2	3.5	3.5	3.4	4.3	1.0	30.3
Age 65+	5.7	7.1	8.7	8.4	10.4	11.7	6.0	105.3
Colonoscopy								
Age 45-64	3.9	3.7	3.5	3.2	2.6	2.8	-1.1	-28.2
Age 65+	10.8	11.1	11.0	9.9	9.5	9.9	-0.9**	-8.3
Cystoscopy								
Age 45-64	5.3	4.8	4.6	3.8	3.8	3.7	-1.6	-30.2
Age 65+	14.7	14.8	14.6	13.2	12.6	12.5	-2.2	-15.0

*Sample n falls between 30 and 100; results should be interpreted with caution.

**In the National Hospital Discharge Survey, sample sizes among the 45 to 64 year old age group for these two procedures were small, and it cannot be said for certain that the 1987 rates were significantly different from the 1982 rates using a 95 percent confidence interval as the standard.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

3.3.2 Cardiac Procedures

As shown in Tables 3-4-A and 3-4-B, there was a dramatic increase in inpatient utilization rates for nearly all cardiac procedures studied. (The exceptions were temporary and permanent pacemakers.) For five of the seven procedures, the increases in utilization were more marked for the elderly than for the non-elderly. For the elderly, the largest absolute increases in utilization were for electrographic monitoring: 8.1 per 1,000. Absolute increases in total rates of cardiac catheterization and angiocardiography were nearly as large. The diffusion of both cardiologists trained in invasive procedures and of cardiac catheterization laboratories were probably important factors in these increases.

Rates for coronary artery bypass surgery (CABG) increased more than twice as much for the elderly as for the non-elderly.* The CABG procedure itself has been in use for approximately 20 years, and diffusion of CABG technology is probably near completion. The large increase (168 percent) in CABG rates for the elderly may reflect an increased aggressiveness of cardiothoracic surgeons regarding the use of this procedure in patients 65 and over, rather than a dramatic increase in the prevalence of coronary artery disease among the elderly. Such increased aggressiveness may result from a number of factors, including:

- lowered mortality and morbidity from the procedure as surgical teams become more adept in caring for these patients;
- increased case-finding through more widespread use of coronary angiography to diagnose coronary artery obstruction; and
- increased competition among surgeons for patients as diffusion of CABG technology nears completion.

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*While the 1982 to 1987 increase for the elderly is quite large, it cannot be said for certain that the actual year-to-year changes are as large as they appear to be. For example, given the Standard Errors in each annual survey and using a 95 percent confidence interval as the standard, the utilization rates calculated for 1986 and 1987 are not significantly different from each other.

TABLE 3-4-A

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED CARDIAC PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Coronary Artery Bypass Graft (CABG)								
Age 45-64	2.4	2.5	2.6	2.8	3.2	3.8	1.4	58.3%
Age 65+	1.9	2.5	2.6	3.1	4.3	5.1	3.2	168.4
Percutaneous Transluminal Coronary Angioplasty (PTCA)								
Age 45-64	---	0.4*	0.6	1.1	1.6	2.3	---	---
Age 65+	---	---	0.4*	0.8	1.5	2.1	---	---
Temporary Pacemaker								
Age 45-64	0.7	0.6	0.6	0.9	0.9	0.8	0.1	14.3
Age 65+	5.0	4.8	4.7	4.8	4.6	3.5	-1.5	-30.0
Permanent Pacemaker								
Age 45-64	---	---	---	0.1*	0.1*	0.3*	---	---
Age 65+	1.0	0.7*	1.1	1.1	0.8	0.8	-0.2	-20.0
Electrographic Monitoring								
Age 45-64	0.9	0.9	1.3	1.7	2.8	2.9	2.0	222.2
Age 65+	2.3	2.9	4.2	6.7	9.7	10.4	8.1	352.2

*Sample n falls between 30 and 100; results should be interpreted with caution.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

TABLE 3-4-B

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR CARDIAC CATHETERIZATION AND ANGIOCARDIOGRAPHY

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
CARDIAC CATHERIZATION AND ANGIOCARDIOGRAPHY								
Cardiac Catheterization Only								
Age 45-64	2.9	3.2	2.8	2.9	2.9	2.7	-0.2	-6.9
Age 65+	2.3	2.6	2.6	3.2	3.6	3.6	1.3	56.5
Angiocardiography Only								
Age 45-64	0.6	0.8	0.7	0.6	0.5	0.6	---	---
Age 65+	0.5	0.6	0.6	0.6	0.6	0.8	+0.3	60.0
Cardiac Catheterization and Angiocardiography at Same Time								
Age 45-64	2.9	2.9	3.6	4.8	5.6	6.9	4.0	137.9
Age 65+	1.9	2.4	3.4	4.7	5.8	7.2	5.3	278.9
Total Cardiac Catheterization								
Age 45-64	5.8	6.1	6.4	7.7	8.5	9.6	3.8	65.5%
Age 65+	4.2	6.0	6.0	7.9	8.4	10.8	6.6	157.1%
Total Angiocardiography								
Age 45-64	3.5	3.7	4.3	5.4	6.1	7.5	4.0	114.3%
Age 65+	2.4	3.0	4.0	5.3	6.4	8.0	5.6	233.3%

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

Percutaneous transluminal coronary angioplasty (PTCA), an alternative method for treating coronary artery obstruction, shows a different pattern of increases in utilization, with nearly equal growth for both age groups. This technology is newer than the CABG procedure, and is still diffusing. Rates for PTCA in 1987 are similar to 1982 CABG rates for both age groups.

The sharp increase in electrographic heart monitoring may to a large extent represent more accurate reporting of the frequency with which this service was actually provided, rather than a true increase in utilization rates. Cardiac monitoring has been a standard practice in intensive care settings for many years.

3.3.3 Diagnostic Imaging Procedures

The largest absolute increases in rates of procedures were seen for two types of diagnostic imaging: CT scans and diagnostic ultrasound (see Table 3-5). The total rate of inpatient CT scans increased by 17.4 per 1,000 for the elderly, and by 5.2 for the non-elderly. Note that even though both rates more than doubled in relative terms, the actual increase in inpatient CT scans for the elderly was more than three times that of the younger age group. Most of the difference in the total CT rate can be accounted for by the more rapid increase in the use of head CT scans for the elderly (an increase of 10.4 per 1,000 for those 65 and over, *versus* 2.2 per 1,000 for those 45 to 64). A higher utilization rate for head CTs may be appropriate among the elderly, since older patients are more likely to require evaluation for possible strokes or intracranial tumors.

A marked increase in the inpatient utilization rate of diagnostic ultrasound was also observed, but again to a much larger extent among older patients. The ultrasound rate increased by 15.5 per 1,000 for patients 65 and older, and by 4.6 for patients aged 45 to 64. The procedure responsible for most of this increase in both age groups was echocardiography (diagnostic ultrasound of the heart).

TABLE 3-5

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED DIAGNOSTIC IMAGING PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
CT Scan-Head								
Age 45-64	1.9	2.7	3.3	3.9	4.1	4.1	2.2	115.8%
Age 65+	5.8	8.7	11.2	14.8	16.3	16.2	10.4	179.3
CT Scan-Thorax								
Age 45-64	0.2*	0.3*	0.4	0.5	0.5	0.7	---	---
Age 65+	0.3*	0.3*	1.1	1.3	1.5	1.9	---	---
CT Scan-Abdomen								
Age 45-64	0.6	0.9	1.0	1.5	1.8	1.9	1.3	216.7
Age 65+	1.2	2.3	2.9	4.0	4.4	5.3	4.1	341.7
CT Other								
Age 45-64	0.9	1.2	1.9	1.9	2.0	2.1	1.2	133.3
Age 65+	2.0	2.3	2.8	2.7	3.3	3.3	1.3	65.0
Total CT Scans								
Age 45-64	3.6	5.4	6.6	7.8	8.3	8.8	5.2	144.4
Age 65+	9.3	13.6	17.9	22.8	25.5	26.7	17.4	187.1
Magnetic Resonance Imaging (MRI)								
Age 45-64	---	---	---	---	0.1	0.5	---	---
Age 65+	---	---	---	---	0.2	1.1	---	---
Diagnostic Ultrasound								
Age 45-64	3.4	4.3	4.7	6.7	7.5	8.0	4.6	135.3
Age 65+	7.2	9.1	11.9	17.8	20.1	22.7	15.5	215.3

*Sample n falls between 30 and 100; results should be interpreted with caution.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

Magnetic resonance imaging (MRI) began to appear in the NHDS data with some frequency by 1986. As of 1987, however, these tests still contributed relatively little to the overall increase in inpatient diagnostic non-OR procedures.

3.3.4 General Surgical Procedures

We included in our analysis several major surgical procedures that have undergone little technological innovation over the past decade. Table 3-6 shows that the absolute changes in cases per 1,000 population have been small for these procedures, with the exception of inguinal hernia repair. Even though, for both groups, the inpatient rate of hernia repair is declining, it is unlikely that the actual incidence of inguinal hernias is falling. Rather, it seems more likely that the change in rates represents a shift of these procedures to outpatient settings.

Although the absolute changes in rates are small for partial excision of the large intestine, especially among the younger age group, there appears to be a slow but steady increase in the rate of procedures per year. This increase may perhaps indicate a slight improvement in the diagnosis of colonic cancer at earlier stages, when surgical intervention may be curative.

3.3.5 Orthopedic Procedures

Two of the procedures in this group (total hip replacement and total knee replacement) doubled for the older age group during our six-year study period (see Table 3-7). These increases may reflect improvements in prosthetic devices (especially in artificial knees), and in the diffusion of orthopedic surgeons trained to perform these procedures. The increase in knee replacements for the younger age group also nearly doubled, while the rate for total hip replacements in this group was nearly stable. The different rate levels (as well as the percent changes) for the two groups of patients reflects the much lower incidence of knee and hip disease among the younger

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TABLE 3-6

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED GENERAL SURGICAL PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Total Cholecystectomy ***Without*** Common Duct Exploration								
Age 45-64	3.4	3.3	3.1	3.1	3.1	3.2***	-0.2	-5.9%
Age 65+	4.1	4.6	4.1	4.0	4.6	4.5	0.4	9.8
Total Cholecystectomy ***With*** Common Duct Exploration								
Age 45-64	0.4	0.3	0.4	0.4	0.4	0.4***	0.0	0.0
Age 65+	1.0	1.1	1.1	1.2	1.1	1.3	0.3	30.0
Total Cholecystectomy ***With or Without*** Common Duct Exploration								
Age 45-64	3.8	3.6	3.5	3.5	3.5	3.6***	-0.2	-5.3
Age 65+	5.1	5.7	5.2	5.2	5.7	5.8	0.7	13.7
Partial Excision Large Intestine								
Age 45-64	1.0	1.0	1.1	1.1	1.2	1.2	0.2	20.0
Age 65+	3.4	4.0	3.5	3.8	4.3	4.2	0.8	23.5
Colostomy								
Age 45-64	0.4**	0.4**	0.4	0.5**	0.4**	0.5**	0.1	25.0
Age 65+	1.5	1.6	1.3	1.3	1.5	1.3***	-0.2	-13.3
Inguinal Hernia Repair								
Age 45-64	3.8	3.5	3.1	2.8	2.3	2.2	-1.6	-42.1
Age 65+	5.6	5.1	4.9	4.6	3.7	3.7	-1.9	-33.9

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*Common bile duct exploration is usually performed at the same time as total cholecystectomy. However, not all patients receiving total cholecystectomies receive common bile duct exploration.

**Sample n falls between 30 and 100; results should be interpreted with caution.

***In the National Hospital Discharge Survey, sample sizes among the 45 to 64 year old age group for these two procedures were small, and it cannot be said for certain that the 1987 rates were significantly different from the 1982 rates using a 95 percent confidence interval as the standard.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

TABLE 3-7

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED ORTHOPEDIC PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Open Reduction and Internal Fixation of Femur								
Age 45-64	0.3*	0.4*	0.3*	0.4*	0.4	0.4*	---	---
Age 65+	3.3	3.4	3.6	4.0	3.9	4.1	0.8	24.2%
Total Hip Replacement								
Age 45-64	0.7	0.6	0.7	0.6	0.7	0.7**	0.0	0.0
Age 65+	1.6	1.8	2.5	2.6	2.7	3.2	1.6	100.0
Total Knee Replacement								
Age 45-64	0.3*	0.5*	0.5*	0.4*	0.5	0.6	0.3	100.0
Age 65+	1.2	1.3	1.7	1.8	2.3	2.7	1.5	125.0
Arthroscopy								
Age 45-64	1.2	1.3	1.3	1.0	0.8	0.6	-0.6	-50.0
Age 65+	0.8	0.7*	0.8	0.5*	0.5*	0.6*	---	---

*Sample n falls between 30 and 100; results should be interpreted with caution.

**In the National Hospital Discharge Survey, sample sizes among the 45 to 64 year old age group for these two procedures were small, and it cannot be said for certain that the 1987 rates were significantly different from the 1982 rates using a 95 percent confidence interval as the standard.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

age group. Older patients are more likely both to fracture a hip during a fall, and to have developed severe degenerative joint changes, with limited mobility, from diseases such as rheumatoid arthritis.

Rates of arthroscopy declined for both groups; because of the small sample size, however, it cannot be said for certain that the 1987 rate for the elderly is significantly different than the 1982 rate. Total use rates for arthroscopy may have increased, furthermore, as this diagnostic procedure may be easily performed in ambulatory settings.

3.3.6 Ophthalmologic Procedures

As expected, Table 3-8 shows that nearly 90 percent of cataract extraction procedures, and more than 80 percent of artificial lens insertion procedures, have disappeared from the inpatient sector. Further, a very large decline was noted in a single year, from 1984 to 1985. This is the time at which the PROs required preadmission approval for inpatient lens procedures.

Although it is difficult to demonstrate directly that the decline in inpatient lens procedures represents a shift to ambulatory settings, there is considerable supportive evidence. For the age group 65 and over (including non-Medicare patients), our data show a decline of 62.7 percent in the total number of inpatient cataract removal and lens insertion procedures between 1982 and 1985, or an absolute decline of 498,758 procedures. Previously published data (Helbing and Latta, 1988) showed that 454,240 lens procedures were performed on Medicare beneficiaries in hospital outpatient departments in 1985. If we assume that the incidence of outpatient cataract surgery was low prior to 1982, the close agreement of these figures strongly supports the conclusion that the decline in inpatient lens surgery indeed represents a shift of these procedures to ambulatory settings.

TABLE 3-8

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED OPHTHALMOLOGIC PROCEDURES

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Cataract Extraction Only								
Age 45-64	1.0	0.6	0.3	0.1	0.1	0.1	-0.9	-90.0%
Age 65+	4.5	3.0	1.6	0.6	0.4	0.3	-4.2	-93.3
Lens Insertion Only								
Age 45-64	0.1	0.2	0.2	0.1	0.0	0.0	-0.1	-100.0
Age 65+	0.6	0.7	0.8	0.3	0.2	0.2	-0.4	-66.7
Cataract Extraction and Lens Insertion In Same Admission								
Age 45-64	1.6	1.7	1.5	0.8	0.0	0.2	-1.4	-87.5
Age 65+	11.9	14.8	12.6	4.6	2.6	1.6	-10.3	-86.6
Total Cataract and Lens Procedures								
Age 45-64	2.7	2.5	2.0	1.0	0.1	0.3	-2.4	-88.9
Age 65+	17.0	18.5	15.0	5.5	3.2	2.1	-14.9	-87.6

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

3.3.7 Gynecological Procedures

The procedures shown in Table 3-9 are gynecological procedures whose rates have been corrected for sex. It is interesting to note that little change was observed among either age group in the rate of total abdominal hysterectomy over the six year period, even though the rate for 45 to 64 year old women increased slightly, while the rate for women 65 and older decreased. Since hysterectomy as a procedure has come under careful scrutiny by surgical second opinion and utilization review programs, it is possible that they have been successful in stabilizing rates of hysterectomy for both groups of women.

Dilatation and curettage (D&C) of the uterus can be used either as a diagnostic tool (to obtain and examine the lining of the uterus) or for therapeutic purposes (to evacuate the contents of the uterus). Since we eliminated all D&Cs performed for abortion or during the post-partum period, the majority of the remaining D&C procedures would have been performed for diagnostic purposes. Table 3-9 shows a decline in the inpatient rates of such procedures by three-fourths for the younger age group and by over two-thirds for women 65 and older. These dramatic reductions in a standard procedure most likely represent a shift of such surgery to ambulatory settings.

3.3.8 Miscellaneous Procedures

The three procedures in Table 3-10 show different patterns of change. The first procedure, carotid endarterectomy, is performed to improve circulation to the brain and to decrease the risk of stroke, by removing atherosclerotic plaques from the carotid arteries in the neck. The procedure has been controversial for a number of years because of the variable risk of mortality and morbidity associated with the procedure at different surgical centers, with the surgical risk at many centers exceeding the patient's estimated risk if left untreated. It has been felt that many patients at risk for stroke because of carotid disease would have a better prognosis if managed medically rather than surgically (that is, if they received medication to

TABLE 3-9

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED GYNECOLOGIC PROCEDURES[a]

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Total Abdominal Hysterectomy								
Age 45-64	6.0	5.9	6.1	6.2	6.1	6.1*	0.1	1.7%
Age 65+	2.1	2.0	2.0	2.2	1.9	1.9*	-0.2	-9.5
D&C of Uterus[b]								
Age 45-64	8.6	7.1	4.9	3.5	2.8	2.0	-6.6	-76.7
Age 65+	3.0	2.7	2.3	1.9	1.3	0.9	-2.1	-70.0

[a] Utilization rates are sex-corrected.

[b] Excluding those performed for abortion or in post-partum period.

*In the National Hospital Discharge Survey, sample sizes among the 45 to 64 year old age group for these two procedures were small, and it cannot be said for certain that the 1987 rates were significantly different from the 1982 rates using a 95 percent confidence interval as the standard.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

TABLE 3-10

INPATIENT UTILIZATION RATES PER 1,000 POPULATION FOR SELECTED MISCELLANEOUS PROCEDURES[a]

	1982	1983	1984	1985	1986	1987	Absolute Change 1982-1987	Percent Change 1982-1987
Carotid Endarterectomy								
Age 45-64	0.6	0.6	0.7	0.7	0.4	0.5**	-0.1	-16.7%
Age 65+	2.1	2.5	2.5	2.6	2.1	1.9**	-0.2	-9.5
Transurethral Resection of the Prostate (TURP)[a]								
Age 45-64	4.1	3.4	3.5	3.3	3.2	3.8**	-0.3	-7.3
Age 65+	21.7	22.5	22.0	22.6	22.4	24.4	2.7	12.4
Hemodialysis								
Age 45-64	0.5	0.7	0.8	1.2	1.2	1.2	0.7	140.0
Age 65+	0.5*	0.6*	1.3	1.4	1.8	1.7	---	---

[a] Utilization rates are sex-corrected.

*Sample n falls between 30 and 100; results should be interpreted with caution.

**In the National Hospital Discharge Survey, sample sizes among the 45 to 64 year old age group for these two procedures were small, and it cannot be said for certain that the 1987 rates were significantly different from the 1982 rates using a 95 percent confidence interval as the standard.

Source: National Center for Health Statistics, National Hospital Discharge Survey, 1982-1987.

impede blood clot formation rather than undergo endarterectomy). Furthermore, a recent study, using a panel of physician experts to develop a consensus on appropriate indications for the procedure, found that 32 percent of carotid endarterectomies performed in three geographic areas were performed for inappropriate reasons (Winslow et al., 1988). In this context, then, the modest declines in the rates for this major surgical procedure for both age groups most likely represents a more conservative approach to managing these patients, rather than a shift of this major surgical procedure to ambulatory settings.

The utilization rates for transurethral resection of the prostate (TURP) show small random changes between years, without clear trends. Note, for example, that if the study period had been from 1983 to 1986, the TURP rate for men 65 and over would have shown a decline of 0.8 percent instead of a 12.4 percent increase. Similarly, for men 45 to 64 there is a net decline in the TURP rate between 1982 and 1987, but a net increase from 1983 to 1987.

Inpatient rates for hemodialysis have been increasing for both age groups during the six-year study period. These rates reflect only those dialysis procedures performed within acute-care hospitals. The increasing rate may reflect:

- growth in the population of persons maintained on dialysis, resulting in increased dialysis rates in acute care settings when these patients require hospitalization for any reason;

- increased use of hemodialysis as a supportive measure for patients with temporary renal insufficiency but marginal prognosis (hemodialysis has long been used as a supportive measure for patients with good prognoses).

4.0 CONCLUSIONS AND POLICY IMPLICATIONS

Against a backdrop of dramatically lowered use of the hospital, the overall rate of inpatient procedures performed by physicians increased between 1982 and 1987. The change was not uniform, however, because those performed in operating rooms declined while non-operating room procedures grew. Moreover, although it had previously been recognized that some procedures had increased for the elderly under Medicare, this is the first time that the phenomenon has been documented for adults under 65 years of age, as well. In fact, the data presented in this paper reveal that, for many procedures, the rate of change was greater for the non-elderly than for the elderly.

The magnitude of these changes is large enough that they will have a major influence on both hospital and physician expenditures. It is important, therefore, to understand them more fully.

It is already known that public policy changes affecting Medicare have created incentives that make it advantageous for providers to shift some procedures out of the inpatient setting to other sites (Leader and Moon, 1989; 158-9). Among these are the OBRA provision, implemented in 1982, that extended Medicare coverage of surgery to free-standing ambulatory surgery centers (ASCs). In addition, the Part B deductible and copayment were waived for patients using ASCs. (This last provision has since been revoked, but not until April 1988.)

The introduction of the prospective payment system (PPS) for inpatient services also made it sensible for hospitals to shift care into outpatient departments, which were still paid on a cost basis instead of the flat payment based on diagnosis related group (DRG). In addition, the PROs are authorized to deny Medicare payment for inappropriate or medically unnecessary hospital admissions.

But if these provisions of Medicare policy have helped fuel the shift to outpatient settings for Medicare patients, what explains the changes observed for the 45 to 64 year old group? It is certainly the case that private insurers (and the employers who provide policies for their employees) have

also been concerned about the growth in health care expenditures. HMOs, PPOs, and other cost-conscious plans in the private sector also expanded during this period.

Finally, while the observed declines in many inpatient procedures reflected a shift to cost-based outpatient settings, two additional questions remain: First, what caused the increase in the performance of other procedures? How much was due to improvements in medical technology, or to the diffusion of new procedures to a wider group of practitioners? How much was due to increases in the incidence of particular diseases as the numbers of very old patients (i.e., those over 75) grew? Second, did the increases in outpatient surgery (reported elsewhere) result wholly from a shift out of inpatient settings, or was it, as some have suggested (Leader and Moon, 1989), largely additive to a relatively stable inpatient base?

These questions remain unanswered, but they are important if we are to understand and hope to control this growth in expenditures. To deal with them requires multi-year, patient-specific data that encompasses utilization and expenditures for all services, not merely inpatient or outpatient care. Only then will we be able to understand fully the roots and the meaning of the figures we have reported in this paper.

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This report examines trends in inpatient use of physician services by the elderly and other adults for selected procedures for the time period 1982-1987. The data base used is the national hospital discharge survey, an annual survey, from 1982-1987. Groups of procedures reviewed include endoscopies, cardiac procedures, ~~CT~~ scans, magnetic resonance imaging, diagnostic ultrasound, general surgery, orthopedic surgery, opthalologic procedures, gynecologic procedures, and three miscellaneous procedures, for a otal of over 185 ~~ICD-9~~ Codes. Trends in overall hospital use are reviewed as well as changes in the rates of the following four general types of procedures: diagnostic and therapeutic operating room procedures, and diagnostic and therapeutic non operating room procedures. Changes in the rates of specific procedures discussed above are also reviewed. The documentation includes 11 tables.

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